

# Stormwater Drainage Reports

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A Stormwater Drainage Report and Construction Plans comprise a **Permanent Stormwater Control Plan**, part of **Core Element # 1 – Preparation of a Stormwater Site Plan**. Information on Stormwater Site Plans can be found in Chapter 3 of the *Stormwater Management Manual for Eastern Washington* (SWMMEW). Core Elements (CE) listed below are presented in SWMMEW Chapter 2.

The following should be included in the Drainage Report, as applicable:

- ☐ Project Overview
  - ☐ General description and location of proposed development
- ☐ Existing Conditions Summary (CE # 1, Step 1) and Analysis of Site Limitations
  - ☐ Topography
  - ☐ Drainage patterns
  - ☐ Soils and ground cover
  - ☐ Presence and locations of Critical and/or Sensitive Areas, Flood Hazard Areas
  - ☐ Character of adjacent areas, level and use of development
  - ☐ Existing development
  - ☐ Presence, condition, and capacity of existing stormwater facilities on and off-site
  - ☐ Presence and condition of other existing utilities on and off-site
  - ☐ Erosion and sedimentation potential
  - ☐ Runoff contribution from off-site basins (tributary basins)
  - ☐ Adjacent properties/projects with a history of stormwater problems, note cause if known
  - ☐ Adjacent properties/projects where geologic/technic investigations have identified shallow bedrock, high groundwater, seasonally perched groundwater, clay lenses
  - ☐ Downstream Analysis Report (CE # 1, Step 1 and CE # 4) - See SWMMEW Appendix 3A
- ☐ Proposed Improvements Summary and Applicable Core Elements (CE # 1, Step 2)
  - ☐ Types and Amounts of Ground Cover in development (NPGIS, PGIS, PGPS)
  - ☐ Proposed use of site
  - ☐ Projected ADTs or Trip Ends
  - ☐ Determination of applicable Core Elements (New Development/Redevelopment)
- ☐ Hydrologic Analyses and Design Information(CE # 5 and 6)
  - ☐ Identification of methodology utilized. Acceptable methods of hydrologic analysis for sizing Runoff Treatment and Flow Control facilities are in SWMMEW Chapter 4.
  - ☐ Identification of Climate Region, Design Storm(s), and Precipitation Depth(s)
  - ☐ Pre-Developed, Existing, Post-Developed Basin Maps – See Appendix 3B for a checklist
  - ☐ Pre-Developed, Existing, Post-Developed Soil and Cover information
  - ☐ Determination and justification of curve numbers or coefficients used
  - ☐ Summary of travel times and times of concentration used
  - ☐ Summary of results of Hydrologic Analyses for each basin/sub-basin and condition.
- ☐ Preservation of Natural Drainage Systems (CE # 4)
  - ☐ Locations of Existing and Proposed discharge points, flow patterns
  - ☐ Discharge rates and volumes for Existing and Proposed conditions
  - ☐ Detention/Retention Facility Sizing information, Design/Design Criteria Reporting
  - ☐ Outfall Protection/Dissipation Sizing information, Design/Design Criteria Reporting
- ☐ Runoff Treatment Facility Analysis and Design Information(CE # 5)
  - ☐ Identification of Treatment Facilities selected and sequencing
  - ☐ Treatment Facility Sizing information, Site Suitability Criteria (SSC), Design Reporting

- ☐ Flow Control Facility Analysis and Design Information(CE # 6)
  - ☐ Identification of Flow Control Facilities selected and sequencing
  - ☐ Flow Control Facility Sizing information, Design/Design Criteria Reporting
- ☐ Collection and Conveyance System Analysis and Design Information
  - ☐ Inlet Capacities
  - ☐ Open Channel and Closed Conduit System Capacities and Velocities
  - ☐ Reporting on Design Criteria for these System Elements
- ☐ Source Control (CE # 3)
  - ☐ Identification of Source Control BMPs selected for the project
  - ☐ Identification of party responsible for schedule of activities, maintenance procedures, structural and managerial practices
- ☐ O&M Requirements (CE # 7)
  - ☐ O&M requirements for the selected Runoff Treatment and Flow Control BMPs
  - ☐ Suggested O&M Schedule
  - ☐ Identification of party responsible for O&M
  - ☐ Identification of funding mechanism for O&M
- ☐ Appendices
  - ☐ Hydrologic Computations/Calculations
  - ☐ Hydraulic Calculations, Charts, Nomographs, etc
  - ☐ Geology/Geotechnical Report
  - ☐ Site Specific Soil Logs, Subsurface Investigation Data, Testing Information
  - ☐ Critical/Sensitive Areas Reports or Mapping
  - ☐ Special Studies Reports such as Biological Assessments, Cultural Resources
  - ☐ Flood Hazard Area Mapping (FIRM, etc)
- ☐ Local Requirements (CE # 8) – Each of the Core Elements provides for local jurisdictions to institute Supplemental Guidelines, and CE # 8 provides for the jurisdiction to present other requirements relevant to stormwater facilities, for example, of the jurisdiction's code or development standards. It is recommended that you consult with the local jurisdiction early on to obtain these requirements. The following are examples of guidelines/requirements.
  - ☐ Exceptions/Variations
  - ☐ Redevelopment Requirements
  - ☐ Preferred Hydrologic Analysis Methods
  - ☐ Cold Climate or Snowmelt Considerations
  - ☐ Specific Curve Numbers or Coefficients
  - ☐ Specific Pre-Developed Ground Cover Requirements
  - ☐ Flood Hazard Areas Requirements
  - ☐ Critical/Sensitive Areas Requirements
  - ☐ TMDL or Water Cleanup Plan Requirements
  - ☐ Basin Plan Requirements
  - ☐ Off-Site Basins/Tributary Area Analysis and Handling Requirements
  - ☐ Design Criteria for Collection and Conveyance System Elements
  - ☐ Design Criteria for Flood Control
  - ☐ Design Criteria for Underground Injection Control Facilities
  - ☐ Design Criteria for Low Impact Development
  - ☐ Specific Operation and Maintenance Documentation or Bonding Requirements
  - ☐ Permitting and Approvals List
  - ☐ Other Helpful Guidelines and Checklists

## Appendix 3B – Basin Maps

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**PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**DESIGNER:** \_\_\_\_\_ **COMPANY:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

The following items should be included on pre-developed and post-developed basin maps:

- ☐ Site boundary
- ☐ Basin limits, both on-site and off-site areas which contribute or receive stormwater runoff onto or from the project, field verified by the engineer.
- ☐ Drainage sub-basins. All sub-basins should be clearly labeled and correlated with the calculations.
- ☐ Topographic contours, which should extend beyond the project or drainage basin boundaries to the extent necessary to confirm basin limits used in the calculations; or, in the absence of topographic mapping being available, the Engineer may field verify the basin limits, including contributing off-site areas, and should describe how the basin limits were determined.
- ☐ Significant drainage features, natural or man-made, such as creeks, seasonal drainage channels, culverts, closed depressions, manholes.
- ☐ Time of concentration routes, clearly labeled and correlated with the calculations.
- ☐ Footprint of proposed drainage features, such as ponds, vegetated or other infiltration facilities, pipe routes, ditches.
- ☐ Indications of floodplain limits, as defined by FEMA or other studies.
- ☐ North arrow and scale bar.
- ☐ Wetlands
- ☐ Existing easements

## **Appendix 3C – Stormwater Construction Plans**

**PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**DESIGNER:** \_\_\_\_\_ **COMPANY:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

The following items should be included on stormwater construction plans, as applicable:

- ☐ A plan profile of all key drainage systems including: streets, roads, and drainage facilities
- ☐ Elevation Datum
- ☐ North Arrow
- ☐ Right-of-Way details
- ☐ Outfall details
- ☐ Ditch details
- ☐ Invert elevations, slopes, and lengths of ditches
- ☐ Cross sections of all open ditches
- ☐ Elevations of all inlet grates
- ☐ Size, types, invert elevations, and lengths of all culverts and pipe systems
- ☐ Invert elevations of the existing or other proposed drainage system to which the drainage plan proposes to connect
- ☐ Stationing of all inlets, culverts and pipe systems angle points
- ☐ Invert elevations of pipes at all structures such as catch basins or manholes
- ☐ Construction details for inlets, drywells, detention facilities, etc. (notes referring to standard plans may suffice where applicable)
- ☐ Drainage easements shown, with key dimensions for depicting location, width, and length.
- ☐ The location of existing underground and above-ground utilities
- ☐ Lot grading elevations where appropriate
- ☐ Grading plan for drainage ponds. The grading plan should include existing contours, proposed contours, and catch points. A typical cross section of the pond should be provided in the plans, showing bottom of pond elevation, maximum water surface elevation for the design storm(s), inlet and outlet elevations, berm elevation and slopes, and keyway location and dimensions.

- ☐ Drainage ponds, pipe inlets and outlets, ditches, and drainage structures, which are serving public roads or are in single-family residential neighborhoods, should be horizontally defined with respect to property corners, street stationing, or a coordinate system.
- ☐ Drainage ditches should have their longitudinal grades defined with either a profile or elevation grades at intervals of 50 feet. Ditch centerlines and flow directions should be also be illustrated.
- ☐ Summary of short and long-term operation and maintenance requirements

## Construction Stormwater Pollution Prevention Plan Checklist

Project Name: \_\_\_\_\_

City/County Reference No. \_\_\_\_\_

Review Date: \_\_\_\_\_

On-site Inspection Review Date: \_\_\_\_\_

Construction SWPPP Reviewer: \_\_\_\_\_

### Section I – Construction SWPPP Narrative

#### 1. Construction Stormwater Pollution Prevention Elements

- \_\_\_ a. Describe how each of the Construction Stormwater Pollution Prevention Elements has been addressed through the Construction SWPPP.
- \_\_\_ b. Identify the type and location of BMPs used to satisfy the required element.
- \_\_\_ c. Justify and identify, if necessary, the reason an element is not applicable to the proposal.

#### > 12 Required Elements – Construction Stormwater Pollution Prevention Plan:

- \_\_\_ 1. Mark Clearing Limits
- \_\_\_ 2. Establish Construction Access
- \_\_\_ 3. Control Flow Rates
- \_\_\_ 4. Install Sediment Controls
- \_\_\_ 5. Stabilize Soils
- \_\_\_ 6. Protect Slopes
- \_\_\_ 7. Protect Drain Inlets
- \_\_\_ 8. Stabilize Channels and Outlets
- \_\_\_ 9. Control Pollutants
- \_\_\_ 10. Control De-Watering
- \_\_\_ 11. Maintain BMPs
- \_\_\_ 12. Manage the Project

#### 2. Project Description

- \_\_\_ a. Total Project Area
- \_\_\_ b. Total proposed impervious area
- \_\_\_ c. Total proposed area to be disturbed
- \_\_\_ d. Total volumes of proposed cuts/fill

#### 3. Existing Site Conditions

- \_\_\_ a. Description of the existing topography.
- \_\_\_ b. Description of the existing vegetation.
- \_\_\_ c. Description of the existing drainage

## Construction Stormwater Pollution Prevention Plan Checklist

Project Name: \_\_\_\_\_

City/County Reference No. \_\_\_\_\_

### 4. Adjacent Areas

\_\_\_ I. Description of adjacent areas which may be affected by site disturbance

- \_\_\_ a. Streams
- \_\_\_ b. Lakes
- \_\_\_ c. Wetlands
- \_\_\_ d. Residential Areas
- \_\_\_ e. Roads
- \_\_\_ f. Other

\_\_\_ II. Description of the downstream drainage path leading from the site to the receiving body of water. (Minimum distance of 400 yards.)

### 5. Critical Areas

- \_\_\_ a. Description of critical areas that are on or adjacent to the site.
- \_\_\_ b. Description of special requirements for working in or near critical areas.

### 6. Soils

\_\_\_ Description of on-site soils.

- \_\_\_ a. Soil name(s)
- \_\_\_ b. Soil mapping unit
- \_\_\_ c. Erodibility
- \_\_\_ d. Settleability
- \_\_\_ e. Permeability
- \_\_\_ f. Depth
- \_\_\_ g. Texture
- \_\_\_ h. Soil Structure

### 7. Erosion Problem Areas

\_\_\_ Description of potential erosion problems on site.

### 8. Construction Phasing

- \_\_\_ a. Construction sequence
- \_\_\_ b. Construction phasing (if proposed)

## **Construction Stormwater Pollution Prevention Plan Checklist**

Project Name: \_\_\_\_\_

City/County Reference No. \_\_\_\_\_

### **9. Construction Schedule**

\_\_\_ I. Provide a proposed construction schedule.

\_\_\_ II. Wet Season Construction Activities

\_\_\_ a. Proposed wet season construction activities.

\_\_\_ b. Proposed wet season construction restraints for environmentally sensitive/critical areas.

### **10. Financial/Ownership Responsibilities**

\_\_\_ a. Identify the property owner responsible for the initiation of bonds and/or other financial securities.

\_\_\_ b. Describe bonds and/or other evidence of financial responsibility for liability associated with erosion and sedimentation impacts.

### **11. Engineering Calculations**

\_\_\_ 1. Provide Design Calculations.

\_\_\_ a. Sediment Ponds/Traps

\_\_\_ b. Diversions

\_\_\_ c. Waterways

\_\_\_ d. Runoff/Stormwater Detention Calculations



## Construction Stormwater Pollution Prevention Plan Checklist

Project Name: \_\_\_\_\_

City Reference No. \_\_\_\_\_

### Section II - Erosion and Sediment Control Plans

#### 1. General

- ☐ a. Vicinity Map
- ☐ b. City/County of \_\_\_\_\_ Clearing and Grading Approval Block
- ☐ c. Erosion and Sediment Control Notes

#### 2. Site Plan

- ☐ a. Legal description of subject property.
- ☐ b. North Arrow
- ☐ c. Indicate boundaries of existing vegetation, e.g. tree lines, pasture areas, etc.
- ☐ d. Identify and label areas of potential erosion problems.
- ☐ e. Identify any on-site or adjacent critical areas and associated buffers.
- ☐ f. Identify FEMA base flood boundaries and Shoreline Management boundaries (if applicable)
- ☐ g. Show existing and proposed contours.
- ☐ h. Indicate drainage basins and direction of flow for individual drainage areas.
- ☐ i. Label final grade contours and identify developed condition drainage basins.
- ☐ j. Delineate areas that are to be cleared and graded.
- ☐ k. Show all cut and fill slopes indicating top and bottom of slope catch lines.

#### 3. Conveyance Systems

- ☐ a. Designate locations for swales, interceptor trenches, or ditches.
- ☐ b. Show all temporary and permanent drainage pipes, ditches, or cut-off trenches required for erosion and sediment control.
- ☐ c. Provide minimum slope and cover for all temporary pipes or call out pipe inverts.
- ☐ d. Show grades, dimensions, and direction of flow in all ditches, swales, culverts and pipes.
- ☐ e. Provide details for bypassing off-site runoff around disturbed areas.
- ☐ f. Indicate locations and outlets of any dewatering systems.

#### 4. Location of Detention BMPs

- ☐ a. Identify location of detention BMPs.

## **Construction Stormwater Pollution Prevention Plan Checklist**

Project Name: \_\_\_\_\_

City/County Reference No. \_\_\_\_\_

### **5. Erosion and Sediment Control Facilities**

- ☐ a. Show the locations of sediment trap(s), pond(s), pipes and structures.
- ☐ b. Dimension pond berm widths and inside and outside pond slopes.
- ☐ c. Indicate the trap/pond storage required and the depth, length, and width dimensions.
- ☐ d. Provide typical section views through pond and outlet structure.
- ☐ e. Provide typical details of gravel cone and standpipe, and/or other filtering devices.
- ☐ f. Detail stabilization techniques for outlet/inlet.
- ☐ g. Detail control/restrictor device location and details.
- ☐ h. Specify mulch and/or recommended cover of berms and slopes.
- ☐ i. Provide rock specifications and detail for rock check dam(s), if applicable.
- ☐ j. Specify spacing for rock check dams as required.
- ☐ k. Provide front and side sections of typical rock check dams.
- ☐ l. Indicate the locations and provide details and specifications for silt fabric.
- ☐ m. Locate the construction entrance and provide a detail.

### **6. Detailed Drawings**

- ☐ a. Any structural practices used that are not referenced in the Ecology Manual should be explained and illustrated with detailed drawings.

### **7. Other Pollutant BMPs**

- ☐ a. Indicate on the site plan the location of BMPs to be used for the control of pollutants other than sediment, e.g. concrete wash water.

### **8. Monitoring Locations**

- ☐ a. Indicate on the site plan the water quality sampling locations to be used for monitoring water quality on the construction site. Sampling stations shall be located upstream and downstream of the project site.